

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:
Wai-Fan Yau, et al.

Serial No.: 10/756,122

Confirmation No.: 4554

Filed: January 13, 2004

For: A Low Dielectric Constant Film
Produced from Silicon
Compounds Comprising
Silicon-Carbon Bond

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Group Art Unit: 2823

Examiner: Julio J. Maldonado

REPLY BRIEF TO EXAMINER'S ANSWER DATED FEBRUARY 18, 2009

MS APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: 4/2/09

Signature: 
(Keith M. Tackett)

Dear Sir:

Applicants submit this Reply Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 2823 dated July 22, 2008, finally rejecting claims 15-18, 21-25, 27, and 28. The final rejection of claims 15-18, 21-25, 27, and 28 is appealed. While Applicants maintain each of the arguments submitted in Applicants' previously submitted Appeal Brief, Applicants make the following further arguments in light of the Examiner's Answer.

This Reply Brief is believed to be timely since electronically transmitted by the due date of April 18, 2009, as set by mailing date of the Examiner's Answer mailed February 18, 2009. Please charge any additional fees that may be required to make this Reply Brief timely and acceptable to Deposit Account No. 20-0782/APPM/002592.C7/KMT.

ARGUMENTS

Applicants supplement their arguments in response to the remarks presented in the Examiner's Answer dated February 18, 2009.

A. Claims 15-18, 21, 23-25, 27, and 28 are not obvious over Chiang in view of Matsuura and Hu because the references do not teach, show, or suggest the elements of the claimed invention, and one of ordinary skill in the art would not find the claimed invention obvious from the cited references.

The Examiner maintains that the instant claims are obvious over Chiang's teaching of a conventional method for forming an interconnect structure comprising plasma-free CVD deposition of dielectric layers such as silicon oxide, silicon nitride, siliconoxynitride, parylene, polyimide, and fluoropolymer in light of Matsuura's plasma-free deposition of a dielectric layer from methylsilane and hydrogen peroxide and Hu's plasma polymerized organosilane layer. The Examiner asserts that Matsuura is "silent" with respect to the type of energy used to deposit the dielectric layer, and that Matsuura is "open" to use of other processes, including plasma deposition, by virtue of Matsuura's boilerplate statement at the end of the disclosure that "many modifications and variations" are possible. It does not follow from this statement that Matsuura is "open" to using plasma or any other particular process variation, or that any particular process variation is even feasible.

The Examiner does not explain why Matsuura is aware that layers adjacent to the dielectric layer may be deposited using plasma CVD but chooses not to disclose using plasma for depositing the dielectric layer from methylsilane and peroxide. Moreover, Matsuura is forthright regarding the energy used for depositing his dielectric film, namely the chemical potential energy of the hydrogen peroxide. This is evident from the deposition temperatures disclosed by Matsuura, which are below room temperature. No plasma is needed or wanted for the deposition of Matsuura because the reaction proceeds with hydrogen peroxide, without plasma or increased temperature. Thus, the

disclosure of Matsuura does not teach, suggest, or otherwise make obvious using plasma to deposit a low-k dielectric containing silicon, oxygen, and carbon.

Hu deposits a layer containing silicon, carbon, and oxygen using plasma CVD and precursors having silicon, carbon, and oxygen or nitrogen. Hu gives no indication, however, that any such layer is a low-k dielectric, or that plasma could be used in the process taught by Matsuura. Thus, no teaching of Hu can be relied on to motivate incorporation of plasma into the process of Matsuura or any putative combined process of Chiang and Matsuura.

The Examiner cites Wolf to support the proposition that plasma enhancement is a facile modification to any CVD process. However, Wolf does not support the proposition. Wolf teaches that plasma glow discharge is one of many ways of injecting energy into a chemical reaction, and that PECVD provides a method of depositing films on thermally fragile substrates, and some desirable properties of PECVD deposited films. Wolf does not, however, teach that plasma can be added to any CVD process. In fact, Wolf teaches no more than what one of ordinary skill in the art could learn from Matsuura, that some films can be deposited by PECVD, which Matsuura does for films other than the one relied on by the Examiner.

Applicants therefore maintain that one of ordinary skill in the art would not be led to modify the process of Chiang with teachings of Matsuura and Hu because the required teachings are incompatible, as described above. Applicants accordingly maintain that Chiang, Matsuura, and Hu, alone or in combination, do not teach, show, suggest, or make obvious a method comprising depositing on a substrate a plurality of layers, wherein one or more of the layers is a low dielectric constant oxidized organosilane layer comprising carbon, wherein the low dielectric constant oxidized organosilane layer is deposited in a plasma enhanced process from a mixture comprising a methylsilane compound and an oxidizing gas, the carbon content of the low dielectric constant oxidized organosilane layer is from 1% to 50% by atomic weight, and a top layer of the plurality of layers is a photoresist, as recited by claim 15 and claims dependent thereon. Applicants respectfully maintain their request that the rejection be withdrawn.


B. Claim 22 is not obvious over Chiang in view of Matsuura and Hu as applied to claims 15-18, 21 and 23-25, 27, and 28 and further in view of Chen, because the references do not teach, show, or suggest the elements of the claimed invention.

Chen is cited to address additional limitations of claim 22, and not the claims discussed above. For reasons provided above, Applicants maintain that Chen does not complete the showing of obviousness when read in light of Chiang, Matsuura, and Hu. Accordingly, Applicants respectfully maintain their request that the rejection of claim 22 be withdrawn.

CONCLUSION

For the reasons stated above, Applicants respectfully submit that the rejection of claims 15-18, 21-25, 27, and 28 is improper. Reversal of the rejections is respectfully requested.

Respectfully submitted,

By 
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